

AN UNUSUAL OCCURRENCE OF THREE SPERMATHECAE
IN A SPECIMEN OF HYSTRICHOPSYLLIA DIPPYI

(Siphonaptera)

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In the last few years there have been several articles on anomalies in Siphonaptera involving duplication of spermathecae. These previous articles dealt with fleas normally having one spermatheca, while this article reports duplication in a flea normally having two spermathecae and belonging to a very primitive genus. Holland (1934) wrote an article entitled, "A remarkable instance of retention of a double spermatheca in a Dolichopsyllid flea, *Opisocrostis bruneri* Baker." (The Canadian Entomologist, 75 : 175-176). This is the only reference to this condition observed in North American fleas. F. G. A. M. Smit reviewed previous literature and suggested some viewpoints regarding this condition in female fleas and illustrated a female *Nosopsyllus fasciatus* (Bosc) having paired spermathecae (Monstrosities in Siphonaptera, Tijdschrift voor Entomologie, 90; 35-42, 1947 [1949]). Smit (1949) published a second article (Monstrosities in Siphonaptera II, Entomologische Berichten 12: 436-437).

Early in 1949 a specimen of *Hystrihopsylla dippyi* Rothschild with three spermathecae was observed among fleas routinely being mounted at the San Francisco Field Station. All three spermathecae are about the same size. Two are placed together between the lateral parts of the VII sternum and are apparently paired. The third spermatheca is placed farther posteriorly between the VIII tergum and sternum and IX segment. The head is about 1/15 shorter than the other two. This difference in size is so slight that it may be observed only by measurement. The spermathecae are slightly smaller than those of similar specimens of *H. dippyi* found in the San Francisco Bay region. It may be possible that all three spermathecae are functional since ducts may be seen entering them. Unfortunately, the bleaching action of NaOH treatment has made it impossible to trace these ducts to the bursa copulatrix which is barely discernible. A careful dissection of this flea before bleaching might have answered some of the following questions better than

do the illustrations of sclerotized plates presented in the drawing (fig. 1).

This species of *Hystrichopsylla* was collected at Paradise Cove, Marin County, California, April 11, 1946 by E. L. Kessel. Host: *Scapanus* sp.

It is generally considered that fleas possessing two spermathecae are more primitive than those with a single spermatheca, and *Hystrichopsylla* is probably one of the most primitive genera of fleas. In 1921, Jordan (A link between the double and single receptacula seminis of Siphonaptera. Ectoparasites, 1: 127.) observed a species of flea normally having one spermatheca smaller than the other, suggesting an intermediate stage between the paired and single condition. It appears to me that this article suggests that the ancestral forms of present-day fleas having a single spermatheca formerly had paired spermathecae and lost one through the course of evolution.

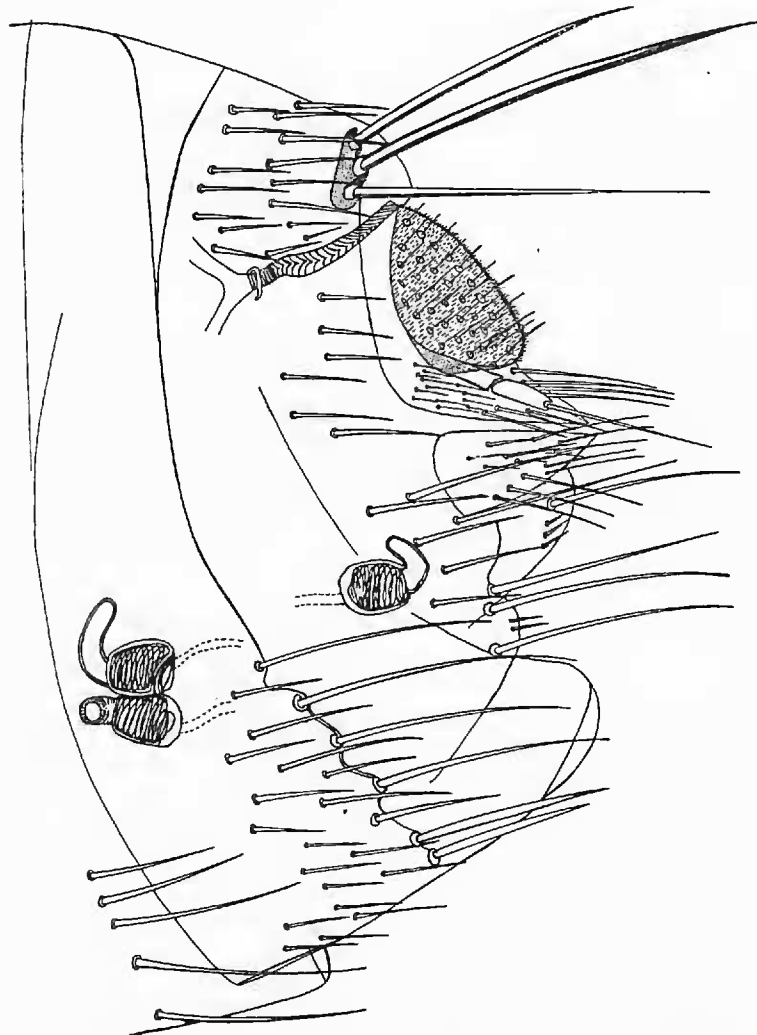


Fig. 1. *Hystrichopsylla gigas dippiei* Roths., with three spermathecae.

To explain the presence of a third spermatheca is not possible from evidence deduced from the morphology of an otherwise normal *Hystrichopsylla* specimen. One supposition might be that ancestral fleas once had four spermathecae and this flea exhibits three as is normally found in the *Tabanidae* (Diptera), the third spermatheca being all that remains of the second pair. From a genetic point of view, any explanation of the processes that have caused this condition from the evidence derived from this flea and other single mounted specimens showing similar anomalous conditions is not only useless but quite pointless. The evidence necessary for an explanation as to the origin would have to come from genetic analysis, progeny tests, etc. Certain limited suppositions may be deduced on a morphological basis.

In his second article on monstrosities of Siphonaptera (op:cit.) Smit describes a female *Xenopsylla cheopis* with paired spermathecae and paired bursae copulatrices. He concludes that this is not atavism but merely a duplication of organs, and that this lends uncertainty to the theory that the ductus obturatorius is a remnant of the ductus seminalis of the ancestral second spermatheca. Therefore another supposition regarding this specimen of *Hystrichopsylla* would hold that anomalous duplication has occurred, such as six toes in some mammals (five being normal since descendency from early amphibians). To explain the manner of this duplication, causing a third spermatheca, would be a hazardous guess, and answers to these other questions are beyond the scope of this paper. It is hoped that this short description, with illustrative drawing, will serve as a small steppingstone in the final analysis of this unusual condition among fleas and other insects.

SYSTEMATIC STUDIES IN PLECOPTERA. By William E. Ricker, Indiana University Publications, Science Series No. 18. Pp. 1-200, 154 text figs. The Indiana Univ. Press, Bloomington, 1952. Price \$3.50.

This work is divided into three parts: I. The genus *Nemoura* in North America (pp. 10-61); II. The family Perlodidae (pp. 62-145); and III. Miscellaneous descriptions and revisions. There is also a bibliography and an index. Dr. Ricker was able to study the late Dr. T. H. Frison's collection and notes; in addition he borrowed material from museums and private individuals both here and abroad. His paper contains many keys, including some to mature nymphs; 1 new genus, 30 new subgenera, 32 new species, 1 new specific name, and many new synonymies are proposed.—H.B.L.